Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

<u>Listing of Claims:</u>

1.   (Currently Amended)   A method of splitting an image block, comprising:

setting a plurality of splitting threshold values ~~for~~ <u>to compare with a characteristic of</u> a macro block in an image frame and determining <u>thereby</u> whether to split the macro block into sub blocks; <u>and</u>

setting a plurality of <u>other</u> splitting threshold values ~~for~~<u>to compare with a characteristic of</u> each sub block and determining <u>thereby</u> whether to split each sub block into smaller sub blocks;

wherein the determining whether to split the image block into sub blocks is performed by determining whether the image block <u>at the same location in a preceding frame</u> has been split ~~in~~ ~~a preceding image frame at the same location~~.

2.   (Currently Amended)   The method of claim 1, wherein the ~~operation of setting a~~ ~~plurality of splitting threshold values for a macro block and~~ determining <u>of</u> whether to split the macro block into sub blocks is performed by determining whether the macro block <u>at a same</u> <u>location in a preceding image frame</u> has been split ~~in a preceding image frame at the same~~ ~~location~~.

3.   (Currently Amended)   The method of claim 1, wherein the ~~operation of setting a~~ ~~plurality of splitting threshold values for each sub block and~~ determining <u>of</u> whether to split each sub block into smaller sub blocks is performed by determining whether the sub block <u>at a same</u> <u>location in a preceding image frame</u> has been split ~~in a preceding image frame at the same~~ ~~location~~.

4.   (Currently Amended)   The method of claim 1, wherein the ~~operation of setting a~~ ~~plurality of splitting threshold values for a macro block in an image frame and~~ determining <u>of</u> whether to split the macro block into sub blocks comprises:

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determining ~~the~~ a possibility of splitting the macro block by determining whether ~~the~~a ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value from among the set splitting threshold values for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block ~~in the operation of setting a plurality of splitting threshold values for the macro block in an image frame and determining whether to split the macro block into the sub blocks~~.

5.   (Currently Amended)   The method of claim 2, wherein the ~~operation of setting a plurality of splitting threshold values for a macro block in an image frame and~~ determining of whether to split the macro block into sub blocks comprises:

determining ~~the~~ a possibility of splitting the macro block by determining whether ~~the~~a ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value from among the set splitting threshold values for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block ~~in the operation of setting a plurality of splitting threshold value for the macro block in the image frame and determining whether to split the macro block into the sub blocks~~.

6.   (Currently Amended)   The method of claim 1, wherein the ~~operation of setting a plurality of splitting threshold values for each sub block and~~ determining of whether to split each sub block into smaller sub blocks comprises:

determining ~~the~~ a possibility of splitting the sub block by determining whether ~~the~~ a ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value from among the other set splitting threshold values for determining the possibility of splitting the sub block; and

determining whether to split the sub block by ~~comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if~~ determining whether the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block ~~in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block~~.

7.   (Currently Amended)   The method of claim 3; wherein the ~~operation of setting a plurality of splitting threshold values for each sub block and~~ determining of whether to split each sub block into smaller sub blocks comprises:

determining ~~the~~ a possibility of splitting the sub block by determining whether ~~the~~ a ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value from among the set other splitting threshold values for determining the possibility of splitting the sub block; and

determining whether to split the sub block by ~~comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if~~ determining whether the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block ~~in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than the threshold value for determining the possibility of splitting the sub block~~.

8.   (Currently Amended)   The method of claim 4, wherein the ~~operation of~~ determining of whether to split the ~~sub-~~macro block ~~by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the macro block is greater than a threshold value for determining the possibility of splitting the sub block~~ comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and ~~the~~ another threshold value from among the set splitting threshold values for determining whether to split the macro block;

determining whether the ~~preceding~~ macro block at the same location in the preceding image frame has been split if the ratio is between the ~~two~~ threshold ~~values~~value and the other threshold value ~~in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block~~; and

determining not to split the macro block if the ~~preceding~~ macro block at the same location in the preceding image frame has not been split, and determining to split the macro block if the ~~preceding~~ macro block at the same location in the preceding image frame has been split and the ratio is between the threshold value and the other threshold value.

9.   (Currently Amended)   The method of claim 6, wherein the ~~operation of~~ determining of whether to split the sub block ~~by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller~~

~~sub block is greater than a threshold value for determining the possibility of splitting the sub block~~ comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and ~~the~~ another threshold value <u>from among the other set splitting threshold values</u> for determining whether to split the sub block;

determining whether the ~~preceding~~ sub block <u>at the same location in the preceding image frame</u> has been split if the ratio is between the ~~two~~ threshold ~~values~~<u>value and the other</u> threshold value ~~in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block~~; and

determining not to split the sub block if the ~~preceding~~ sub block <u>at the same location in the preceding image frame</u> has not been split, and determining to split the sub block if the ~~preceding~~ sub block <u>at the same location in the preceding image frame</u> has been split <u>and the ratio is between the threshold value and the other threshold value</u>.

10.   (Original) The method of claim 1, wherein the image frame is a binocular image frame representing a three dimensional image.

11 – 12 (Canceled).

13.   (Currently Amended)   The method of claim 1, ~~wherein the operation of~~<u>further comprising:</u>

splitting <u>the macro block according to the determining by comparison with the thresholds and the other thresholds whether to split the macro block into sub blocks and into smaller sub blocks</u> ~~is performed~~ using quadtree disparity estimation.

14 – 15 (Canceled).

16.   (Currently Amended)   A method of splitting an image block, comprising:

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setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block by determining whether a ~~preceding~~ macro block at a same location in a preceding image frame has been split ~~in a preceding image frame at the same location~~; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks by determining whether a ~~preceding~~ sub block at a same location in the preceding image frame has been split ~~in a preceding image frame at the same location~~.

17.   (Currently Amended)   The method of claim 16, wherein the ~~operation of setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and~~ determining whether to split the macro block by determining whether the macro block has been split in a preceding image frame at the same location comprises:

determining ~~the~~ a possibility of splitting the macro block by determining whether ~~the~~ a ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value from among the set macro block splitting threshold values for determining the possibility of splitting the macro block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a~~a~~nother threshold value from among the set macro block splitting threshold values for determining whether to split the macro block;

determining whether the ~~preceding~~ macro block at the same location in the preceding image frame has been split if the ratio is between the ~~two~~ threshold ~~values~~value and the other threshold value ~~in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block~~; and

determining not to split the macro block if the ~~preceding~~ macro block at the same location in the preceding image frame has not been split, and determining to split the macro block if the ~~preceding~~ macro block at the same location in the preceding image block has been split and the ratio is between the threshold value and the other threshold value.

18.   (Currently Amended)   The method of claim 16, wherein ~~the operation of setting a~~ ~~plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks~~ ~~and~~ determining of whether to split the sub block into smaller sub blocks by determining whether the sub block has been split in a preceding image frame at the same location comprises:

determining ~~the~~ a possibility of splitting the sub block by determining whether ~~the~~ a ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value from among the set sub block splitting threshold values for determining the possibility of splitting the sub block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and ~~a~~another threshold value from among the set sub block splitting threshold values for determining whether to split the sub block;

determining whether the ~~preceding~~ sub block at the same location in the preceding image frame has been split if the ratio is between the ~~two~~ threshold ~~values~~value and the other threshold value ~~in the operation of determining whether the ratio of maximum MAD to minimum~~ ~~MAD is between the threshold value for determining the possibility of splitting the sub block and~~ ~~the threshold value for determining whether to split the sub block~~; and

determining not to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has not been split, and determining to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has been split.

19.   (Original)   The method claim 16, wherein the image frame is a binocular image frame representing a three dimensional image.

20 – 21 (Canceled).

22.   (Currently Amended)   The method of claim 16~~, wherein~~ further comprising:

splitting the macro block according to the determining of whether the macro block and sub blocks at respective same locations in the preceding image frame have been split ~~is~~

performed using quadtree disparity estimation.

23 – 24 (Canceled).

25.   (Currently Amended)   A recording medium on which a method is written as a program code that can be read and executed on a computer, the program coded method comprising:

setting a plurality of splitting threshold values to compare with a characteristic of for a macro block in an image frame and determining thereby whether to split the macro block into sub blocks; and

setting a splitting threshold value to compare with a characteristic of for each sub block and determining thereby whether to split each sub block into smaller sub blocks;

wherein determining whether to split the macro block into sub blocks is performed by determining whether the macro block at the same location in a preceding image frame has been split in a preceding image frame at the same location.

26.   (Currently Amended)   A recording medium on which a method is written as a program code that can be read and executed on a computer, the program coded method comprising:

setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block by determining whether the macro block at a same location in a preceding image frame has been split in a preceding image frame at the same location; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks by determining whether the sub block at a same location in the preceding image frame has been split in a preceding image frame at the same location.

27.   (Currently Amended)   An apparatus to split an image block, comprising:

a macro block splitting determining unit that sets a plurality of macro block splitting

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threshold values for splitting a macro block in an image frame into sub blocks and determines therewith whether to split the macro block;

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines therewith whether to split the sub block; and

wherein a block splitting determining unit that determines whether to split the image block into sub blocks by determining whether the image block at the same location in a preceding image frame has been split in a preceding image frame at the same location.

28.   (Currently Amended)   The apparatus of claim 27, wherein the macro block splitting determining unit determines whether to split the macro block by determining whether the macro block at a same location in a preceding image frame has been split in a preceding image frame at the same location.

29.   (Currently Amended)   The apparatus of claim 27, wherein the sub block splitting determining unit determines whether to split the sub block by determining whether the sub block at a same location in a preceding image frame has been split in a preceding image frame at the same location.

30.   (Currently Amended)   The apparatus of claim 27, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determining portion that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value from among the macro block splitting threshold values for determining the possibility of splitting the macro block; and

a macro block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block, determines whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum

MAD, and a threshold value from among the macro block splitting threshold values for determining whether to split the macro block with one another.

31.   (Canceled).

32.   (Currently Amended)   The apparatus of claim 27, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determining portion that determines the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value from among the sub block splitting threshold values for determining the possibility of splitting the sub block; and

a sub block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block, determines whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and the a threshold value from among the sub block splitting threshold values for determining whether to split the sub block with one another.

33.   (Canceled).

34.   (Currently Amended)   The apparatus of claim 30, wherein the macro block splitting determining portion comprises:

a preceding macro block splitting determiner that determines whether the preceding macro block at a same location in a preceding image frame has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block at the same location in the preceding image frame has not been

split, and determines to split the macro block if the ~~preceding~~ macro block at the same location in the preceding image frame has been split.

35.   (Currently Amended)   The apparatus of claim 32, wherein the sub block splitting determining portion comprises:

a preceding sub block splitting determiner that determines whether the ~~preceding~~ sub block at a same location in a preceding image frame has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has not been split, and determines to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has been split.

36.   (Original) The apparatus of claim 27, wherein the image frame is a binocular image frame representing a three dimensional image.

37 – 38 (Canceled).

39.   (Currently Amended)   The apparatus of claim 27, wherein splitting of the macro block and the sub block is performed using quadtree disparity estimation.

40 – 41 (Canceled).

42.   (Currently Amended) An apparatus to split an image block, which comprises:

a macro block splitting determining unit that sets a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determines whether to split the macro block by determining whether the macro block at a same location in a preceding image frame has been split ~~in a preceding image frame at the same location~~; and

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines whether to split each sub block by determining whether the sub block <u>at a same location in the preceding image frame</u> has been split ~~in the preceding image frame at the same location~~.

43.   (Currently Amended)   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determiner that determines ~~the possibility of splitting the macro block by determining~~ whether ~~the~~ <u>a</u> ratio of maximum mean absolute difference (MAD) to minimum MAD of the sub block in the macro block is greater than a threshold value <u>from among the set macro block splitting threshold values</u> for determining the possibility of splitting the macro block;

a preceding macro block splitting determiner that determines whether the ~~preceding~~ macro block <u>at the same location in the preceding image frame</u> has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value <u>from among the set macro block splitting threshold values</u> for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the ~~preceding~~ macro block <u>at the same location in the preceding image frame</u> has not been split, and determines to split the macro block if the ~~preceding~~ macro block <u>at the same location in the preceding image frame</u> has been split.

44.   (Currently Amended)   The apparatus of claim 42, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determiner that determines ~~the possibility of splitting the sub block by determining~~ whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the smaller sub block in the ~~macro~~ <u>sub</u> block is greater than a threshold value <u>from among the sub block splitting threshold values</u> for determining the possibility of splitting the sub block;

a preceding sub block splitting determiner that determines whether the ~~preceding~~ sub

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block at the same location in the preceding image frame has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and a threshold value from among the sub block splitting threshold values for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has not been split, and determines to split the sub block if the ~~preceding~~ sub block at the same location in the preceding image frame has been split.

45.   (Original)   The apparatus of claim 42, wherein the image frame is a binocular image frame representing a three dimensional image.

46 – 47 (Canceled).

48.   (Currently Amended) The apparatus of claim 42, wherein splitting of the macro block and the sub block is performed using quadtree disparity estimation.

49 – 50 (Canceled).

51.   (Currently Amended) A method of splitting an image block, comprising:
splitting macro image blocks each of left-eye views and right eye views into sub image blocks according to quadtree disparity estimation using a plurality of splitting threshold values;
splitting each sub block into smaller sub blocks according to the quadtree disparity estimation using a plurality of other splitting threshold values; and
~~wherein an image block splitting~~ determining ~~unit determines~~ whether to split the image block by determining whether the image block at the same location in a preceding frame has been split ~~in a preceding image frame at the same location~~.

52.   (Currently Amended) The recording medium of claim 25, the program coded method further comprising:

determining whether ~~to split the sub block into smaller sub blocks is performed by determining whether~~ the sub block <u>at a same location in a preceding image frame</u> has been split ~~in a preceding image frame at the same location~~.

53.   (Currently Amended) The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determiner that ~~determines the possibility of splitting the macro block by determining~~ whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the sub block in the macro block is greater than a threshold value<u> from among the macro block splitting threshold values</u> for determining the possibility of splitting the macro block.

54.   (Currently Amended)   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a preceding macro block splitting determiner that determines whether the ~~preceding~~ macro block <u>at a same location in a preceding image frame</u> has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value <u>from among the macro block splitting threshold values</u> for determining whether to split the macro block.

55.   (Currently Amended)   The apparatus of claim 54, wherein the macro block splitting determining unit comprises:

a macro block splitting final determiner that finally determines not to split the macro block if the ~~preceding~~ macro block <u>at the same location in the preceding image frame</u> has not been split, and determines to split the macro block if the ~~preceding~~ macro block <u>at the same location in the preceding image frame</u> has been split.

56.   (Currently Amended) The method of splitting an image block of claim 51, ~~wherein the image block splitting determining unit comprises~~<u>further comprising</u>:

~~a macro block splitting determining unit determines whether~~<u>determining not</u> to split the

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macro block if ~~by determining whether~~ the macro block at a same location in a preceding image frame has not been split ~~in a preceding image frame at the same location~~.

57.   (Currently Amended) The method of splitting an image block of claim 51, ~~wherein the image block splitting determining unit comprises~~ further comprising:

~~a sub-block splitting determining unit determines whether~~ determining not to split the sub block ~~by determining whether~~ if the sub block at a same location in a preceding image frame has not been split ~~in a preceding image frame at the same location~~.